

Motorized Stage User's Manual

SBIS series



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For your safety

Before using this product, read this manual and all warnings or cautions in the documentation provided.

Only Factory Authorized Personnel should be changes and/or adjust the parts of controller.

The symbols used in this manual

 WARNING	 CAUTION
This symbol marks warnings that should be read and used to prevent serious injury or death.	This symbol indicates where caution should be used to avoid possible injury to yourself or others, or damage to property.

The above indications are used together with the following symbols to indicate the exact nature of the warning or caution.

Examples of Symbols Accompanying Warnings and Cautions	
	△ Symbols enclosed in a triangle indicate warnings and cautions. The exact nature of the warning or caution is indicated by the symbol inside (the symbol at left indicates risk of electrocution).
	○ Symbols enclosed in a circle mark indicate prohibitions (actions that must not be performed). The exact nature of the prohibition is indicated by the symbol inside or next to the circle mark (the symbol at left indicates that the product must not be disassembled).
	● Symbols inside a black circle mark actions that must be performed to ensure safety. The exact nature of the action that must be performed is indicated by the symbol inside (the symbol at left is used in cases in which the AC adapter must be unplugged to ensure safety).

Symbols on the product

The symbol mark on the product calls your attention. Please refer to the manual, in the case that you operate the part of the symbol mark on the product.

	This symbol labeled on the portion calls your attention.
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- ① SIGMAKOKI CO., LTD. does not accept liability for damages resulting from the use of this product or the inability to use this product.
- ② SIGMAKOKI CO., LTD. does not accept liability for damages resulting from the use of this product that deviates from that described in the manual.
- ③ SIGMAKOKI CO., LTD. does not accept liability for damages resulting from the use of this product in extraordinary conditions, including fire, earthquakes, and other acts of God, action by any third party, other accidents, and deliberate or accidental misuse.
- ④ If the equipment is used in a manner not specified by the SIGMAKOKI CO., LTD., the protection provided by the equipment may be impaired.



WARNING

- Do not use this product in the presence of flammable gas, explosives, or corrosive substances, in areas exposed to high levels of moisture or humidity, in poorly ventilated areas, or near flammable materials.
- Do not connect or check the product while the power is on.
- Installation and connection should be performed only by a qualified technician.
- Do not bend, pull, damage, or modify the power or connecting cables.
- Do not touch the products internal parts.
- Connect the earth terminal to ground.
- Should the product overheat, or should you notice an unusual smell, heat, or unusual noises coming from the product, turn off the power immediately.
- Do not turn on the power in the event that it has received a strong physical shock as the result of a fall or other accident.
- Do not touch the stage while operation.
- Use dry clothes only for cleaning the equipment.

Chapter 1: Before you begin

1-1. Package contents

Purchasers of the Stage should find that the package contains the items listed below. Check the package contents using the following checklist. Contact your retailer as soon as possible if any item is missing or damaged.

- ☐ SBIS Stage (It's included connector for power supply)
- ☐ User's Manual (This Manual)

1-2. Overview

This is motorized stage with five-phase stepping motor that included controller and driver.

Because this controller has a micro-step driver built-in, the smooth movement in high resolving power is possible.

When the SBIS Stage is connected to an ordinary personal computer (It'll called PC below.) via a customized RS232C interface cable, the stage can be accurately moved to the desired position by commands sent from the PC.

In addition, manual operation is possible by knob.

It can control until 99 stage by connect between stage and stage like serial connect.

1-3. Name and function on the SBIS stage

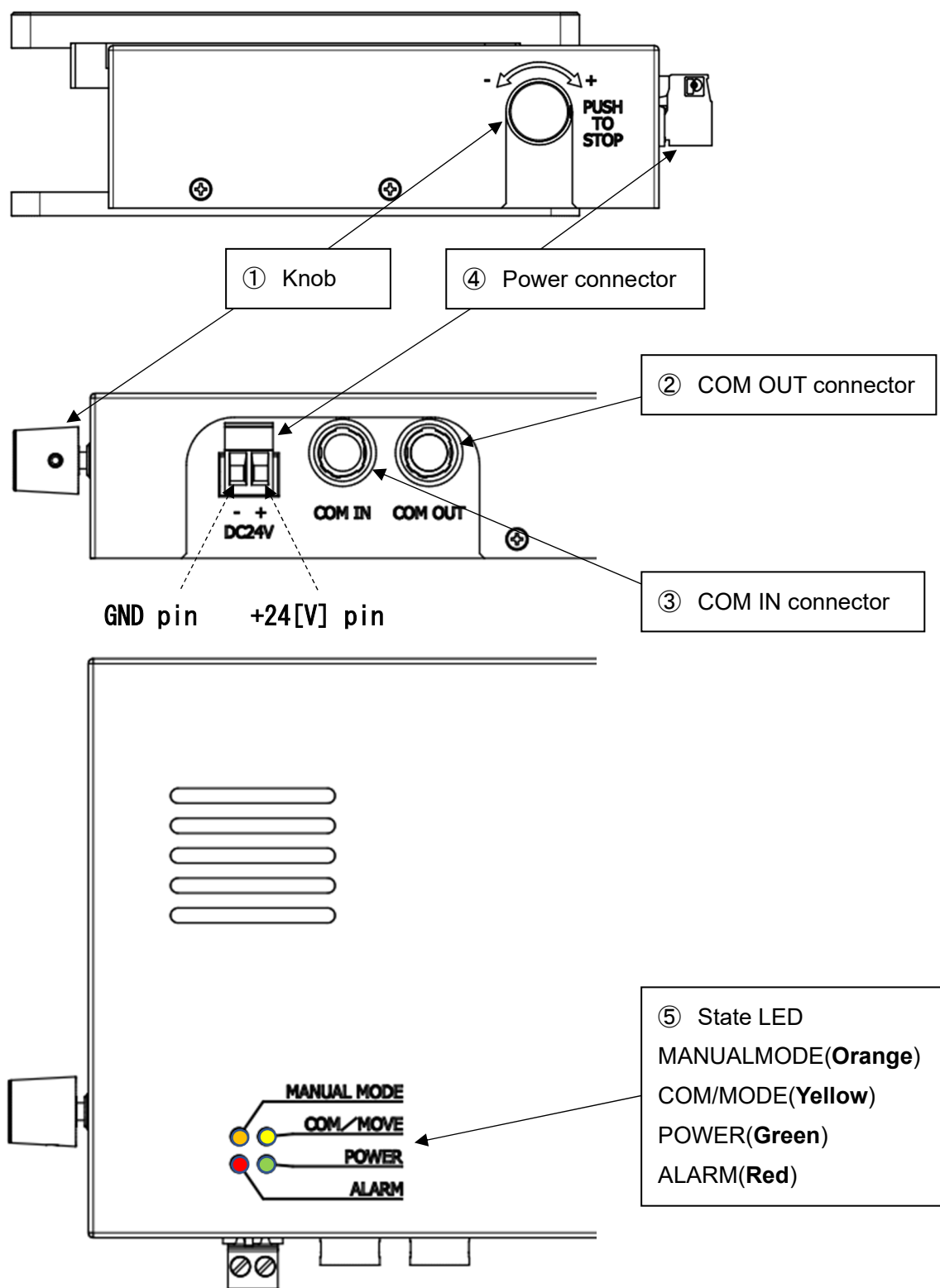


Figure 1-3-1 : MANUAL operation knob (COM OUT • COM IN • Power) connector state LED

① knob :

It's use for MANUAL operation.

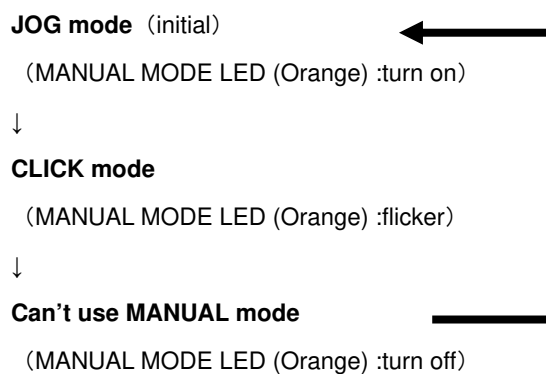
When control by command or during moving, can't use knob on MANUAL operation mode.

When control by knob, this moving will stop by control command and it'll response "NG".

■state transition of MANUAL operation mode

When continue push knob until over the 1[s], It'll change to MANUAL operation mode by knob operation.

<state transition of MANUAL operation mode>



■JOG mode MANUAL MODE LED (Orange) turn on

(first of all state when turn on power)

When turn right knob, stage will move to knob side.

When turn left knob, stage will move to opposite side of knob.

If knob returns to initial point, it'll stop.

(It's 0 click points on knob)

It'll stop by push knob.

It'll change speed by how many click of turn the knob.

First, 0 means stop.

Speed will change 1 to 10 steps by click knob.

When 10 click means 100[%] speed, other click speed will change by number of click knob.

When during turn on yellow LED, it means state of moving stage.

***) Don't touch the stage while moving stage for safety.**

■ **JOG mode** MANUAL MODE LED (Orange) flicker

When turn knob, it'll move every click by set number of pulses by CR: command.

■ **Can't use MANUAL mode** MANUAL MODE LED (Orange) flicker

It means that it can't use MANUAL operation mode.

② COM OUT connector :

It's the output connector that have function of power supply between stage and stage.

Connect power every 3 stage by built-in power wire connect cable. (HR10HR10P-RC-1)

In this case that like this above every 3 stage,

It has to connect by cable that doesn't have power wire. (red mark) (HR10HR10-RC-1)

③ COM IN connector :

It's the input connector that have function of power supply between stage and stage.

Please use built-in power wire connect cable (Red mark)

■ **Nearest stage from PC**

Connect to this connector by built-in power wire connect cable.

Next, connect D-sub side to PC. (D9HR10-RC-3)

■ **Other stage that nearest stage from PC**

Connect power every 3 stage by built-in power wire connect cable. (HR10HR10P-RC-1)

In this case that like this above every 3 stage,

It must connect by cable that doesn't have power wire. (red mark) (HR10HR10-RC-1)

④ Power supply connector :

It's power supply connector for DC 24[V].

Connect power every 3 stage.

It needs to supply enough current for 3 stage.

It's a recommend AC adaptor. AC-ADP-2433 (24[V] 3.33[A])

NOTE:

If you use enough current supply AC adaptor than above AC adaptor too, but you must connect stop until 3 stage every AC adaptor.

⑤ State LED :

It's display LED for stage state.

Check information of State LED on Figure 1-4-1.

■**MANUAL MOSE (Orange)** :

State LED of MANUAL operation mode.

Turn on LED: JOG mode

It'll continues variable speed change during moving.

Flicker LED: CLICK mode

Every click move that set number of pulses.
(flicker time is about 0.5[s])

Turn off LED: Can't use MANUAL mode

It can't use MANUAL mode.

■**COM/MODE (Yellow)** :

State LED of during communication or moving.

Turn on LED:

State of during communication or moving.

Flicker LED:

State of After, power on this equipment, until unlock electromagnetic brake on Z type.
(flicker time is about 0.1[s])
If unlock the electromagnetic brake, state LED become to turn off.

Turn off LED:

Other state of above.

■**POWER(Green)** :

State LED of power.

Turn on LED:

State of turn on power.

Turn off LED:

State of turn off power.

Flicker LED:

It needs to increase voltage.
It means state of decreasing voltage right now.
In this case of Z type, it probably there are a few cases that become to lock electromagnetic brake.

NOTE:

There are a few cases that become to electromagnetic turn off in Z type.

(flicker time is about 0.5[s])

■ALARM(Red) :

State LED of error

Turn on LED:

State of command error.

If receive normal command, it'll turn off.

Turn off LED:

State of there isn't any error.

If it receives correct command,
state LED will 'turn off.

Flicker LED:

State of hardware error.

(flicker time is about 0.5[s])

Flicker LED:

State of internal system error.

(flicker time is about 0.1[s])

If there is like this case that when you restart
power on a few times, but it can't turn off
state LED, this equipment is probably
broken down.

In this case,

Please inform it to sales department.



Turn off a power supply in the case of the connector connection for safety.

1-4. Example connect

The stage can connect until 99 stage. If you send command for connect, device number will automatically assign like 1~99 from nearest axis from PC.

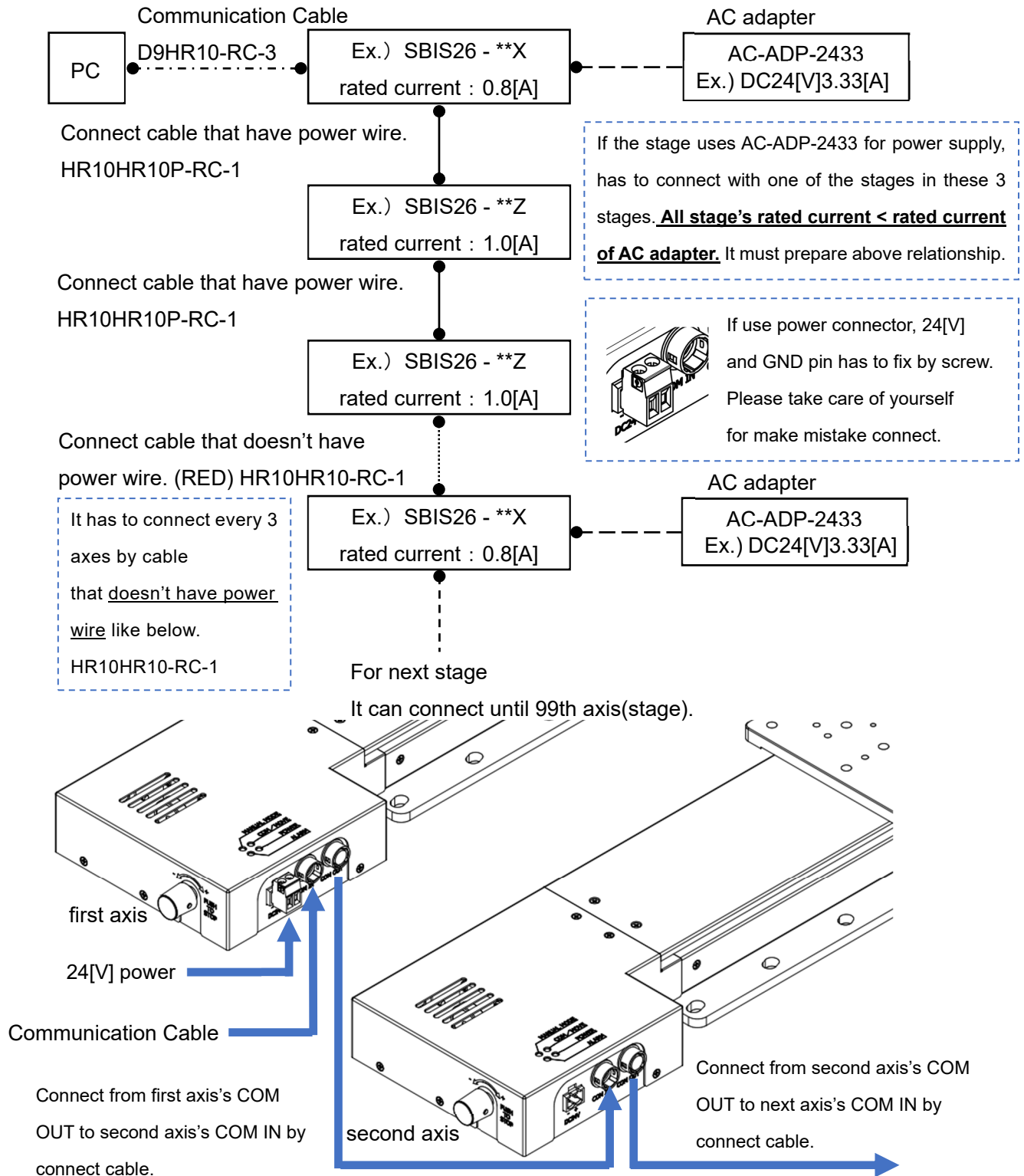


Figure 1-4-1 : Ex.) SBIS Stage connect diagram

1-5. Connect flow

- ① Confirm the power didn't connect to power supply connector.
- ② Connect SBIS stage to PC by communication cable for SBIS that customized RS232C.
refer to above Figure SBIS Stage connect diagram.
- ③ In second or later case, connect SBIS stage to next SBIS stage by built-in power wire connect cable or cable that doesn't have power wire.
- ④ Turn on power.

Chapter 2: How to move SBIS stage by command control

2-1. How to use SBIS stage by command control from computer

This stage can be connected to a computer using a RS232C interface. Motorized stages can then be precisely controlled by commands send from the computer.

The interface communication parameter is below table 2-1.

Please set the configurations of the PC side according to following the table.

Table 2-1 : communication setting

Parameter	Descriptions
Baud rate	38400 [bps]
Delimiters	CR+LF
Parity	None
Data bits	8bit
Stop bit	1bit
Flow control	none

2-2. Format of commands

This stage has 5 kind of method for request device.

【 command 】 : 【 device request method 】

There are a few commands that can't use all kind of "device request method".

Table 2-2-1 : Format outline of commands

Device request method style	Style sentences	Device request method style's parameter detail
Device number	D	It requests the stage by device number. Unique number that automatically assigned from nearest from PC It called device number.
Block number	B	It requests the stage by block number and block device number. It can set number some devices from 1 to 8 like 1 group by BS command. This number will be called block number on this manual. Each block has block number (1~8). ■Block device number request It can request the stage by serial number on a block. ■Connected all devices on a block request It can request connected all devices on a block. NOTE: If you never set block number and block device number by BS command before use it, can't use block number and block device number when request the device.
Serial number	S	It can request the stage by serial number that fixed when ship from factory.
Connected all devices	A	It can request connected all devices.

Format of send and response by command is like below table.

Table 2-2-2 : Format example of commands

Device request method style	Each request method style's Format	Example Detail	Response of header sentences
Device D	Cmd:D,aa aa: Device number 1~99	H:D,1 Send H command to device number 1.	D,aa
	Case of plural devices number request Cmd:D,aa1,aa2 aa1,aa2: Device number 1~99 It can request device number until 8 devices. If you request same block device number of same block number on this command, It'll response NG.	H:D,1,2 Send H command to device number 1 and 2.	D:aa1,aa2
Block B	Cmd:B,a,bb a: Block number 1~8 bb: Block device number 1~8 It can request block device number until 8 devices. If you request same block device number of same block number on this command, It'll response NG.	H:B,1,1 Send H command to block device number 1 on block number 1.	B,a,bb

Device request method style	Each request method style's Format	Example Detail	Response of header sentences
Block B	Case of plural devices number request Cmd:B,a,bb1,bb2 a: Block number 1~8 bb1,bb2: Block device number 1~8 You can request block device number until 8 devices. If you request same block device number of same block number on this command, It'll response NG.	H:B,1,1,2 Send H command to block device number 1 and 2 on block number 1.	B,a,bb1,bb2
	Cmd:B,a,A a,A: All of block device number on one of the block.	H:B,1,A Send H command to connected all devices on one of the block.	B,a,bb
Serial number S	Cmd:S,aaaaaa aaaaaa: Serial number (strings)	H:S,012345 Send H command to serial number 012345.	S,aaaaaa
	Case of plural devices number request Cmd:S,aaaaaa1,aaaaaa2 aaaaaa1,aaaaaa2: Serial number (strings) It can request serial number until 8 devices. If you request same serial number on this command, It'll response NG.	H:S,000001,000002 Send H command to serial number 000001 and 000002.	S:aaaaaa1,aaaaaa2

Device request method style	Each request method style's Format	Example Detail	Response of header sentences
All of device A	Cmd:A A: Connected all devices.	H:A Send H command to connected all devices.	D,aa

NOTE: When you use H, L, R, M, MP, A, AP, J, D, DM, OM and C command, you can use method of plural devices number request.

2-3. Function of double buffer

It's a function of automatically execute continually move by set to function of double buffer use with MP or AP command.

2-3-1. Double buffer process

When use below command of double buffer moving, it'll change to double buffer mode and It'll start move.

When complied moving, MP or AP command can get response.

Next value of prebuffer moved to execute buffer. After that value of prebuffer will clear.

If you set to value on prebuffer, continually moving can execute.

Until get response time, if there isn't set to prebuffer, it'll stop automatically execute continually.

In this case, you need set to prebuffer and so on.

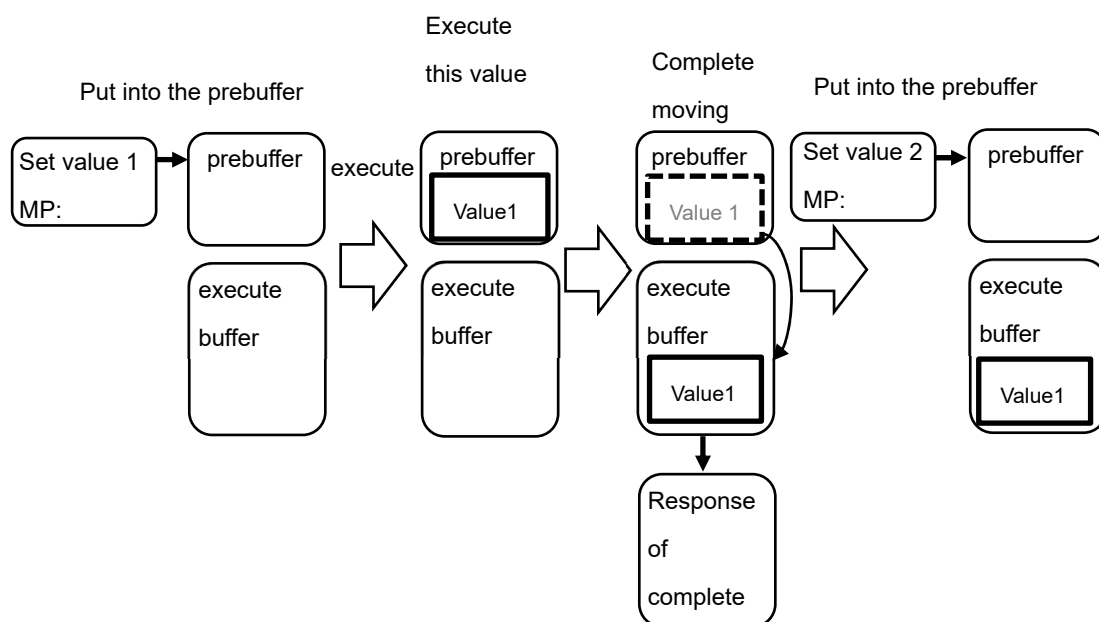


Figure 2-3-1 : Double buffer process

Table 2-3-1 : Command of double buffer function

command	detail	More detail
MP:	Set number of pulses for relative movement on prebuffer.	Double buffer setting
AP:	Set number of pulses for absolute movement on prebuffer.	Double buffer setting
WT:	Set waiting time	
?:MP	Get number of pulses for relative movement on prebuffer	
?:AP	Get number of pulses for absolute movement on prebuffer.	

2-3-2. If send MP or AP command, take care

If you put value into prebuffer, already putted value on prebuffer will remove by overwrite.

So, take care it.

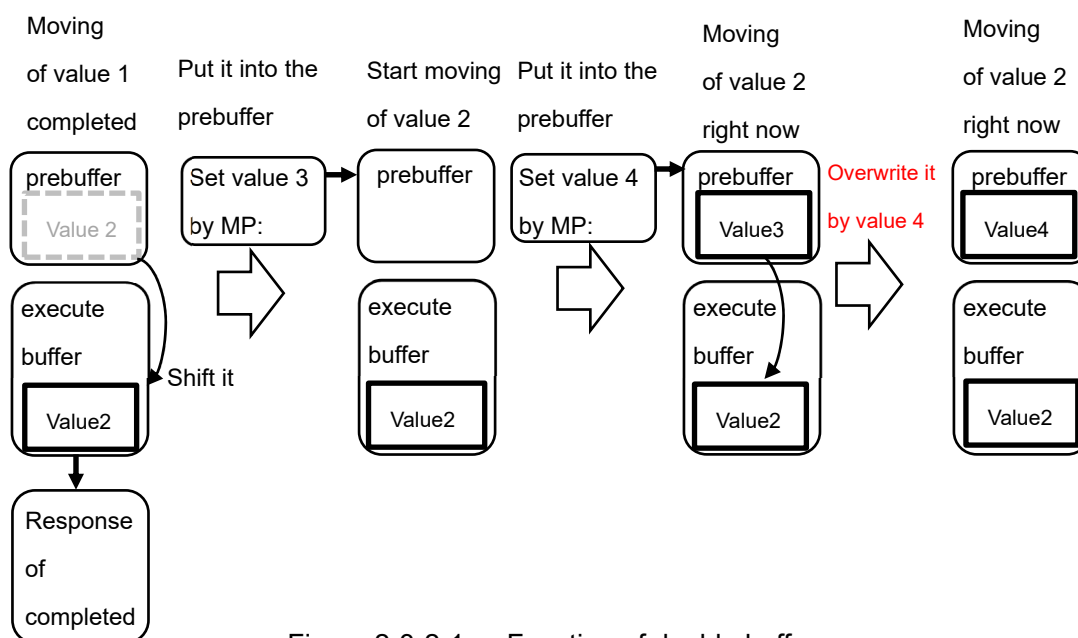


Figure 2-3-2-1 : Function of double buffer

2-3-3. About setting of speed during executing double buffer mode

D command can set speed during executing double buffer mode.

It's an example send command of

①

Ex.) MP:D,1,10000 It'll start relative movement 10000[pulse] on double buffer mode.

②

Ex.) D:D,1,100,1000,200

Case of set to speed below during moving by above command.

(S=100 [pps], F=1000 [pps], R=200 [ms])

③

Ex.) MP:D,1,-10000 It'll start relative movement -10000[pulse] on above speed.

2-4. List of commands

The following is a list of available commands:

Table 2-4-1 : List of commands

Command	Movement	Detail
#CONNECT:	Set to initial device number.	After connected each other stage, power on this equipment. And it's a necessary command before use it.
CONNECT?	Check of initial device number.	
H	Return to mechanical origin	Return to mechanical origin movement
M	Set number of pulses for relative movement.	Setting of movement, direction, number of pulses with relative coordinate.
MP	Set number of pulses for relative movement on prebuffer.	Setting of movement, direction, number of pulses with relative coordinate.
A	Set number of pulses for absolute movement.	Setting of movement, direction, number of pulses with absolute coordinate.
AP	Set number of pulses for absolute movement on prebuffer.	Setting of movement, direction, number of pulses with absolute coordinate.
J	Jog moving	Move by minimum speed (S).
K	Set of linear interpolation movement	Linear interpolation movement.
E	Set of circular interpolation movement.	Circular interpolation movement.
L	Stop as slowly	Stop like reduce speed.
LE	Stop as quickly	Stop without reduce speed.
R	Set electronic (logical) origin	Set the electronic (logical) origin to the current position.
D	Set of speed	Speed S[pps], F[pps], R[ms] It'll use for other move kind command of H command.
C	Change excitation of motor	Excitation ON / OFF motor.
Q	Get of status 1	Response of current position.
SRQ	Get of status 2	Response of moving status and error.
!	Get of status 3	Response that B(Busy) or R(READY).
*IDN?	Get of equipment information.	Response of equipment information. Vender name, equipment name, serial number and embedded software version.

Command	Movement	Detail
?	Get of Internal information.	Response of internal equipment information. Vender name, equipment name, serial number embedded software version, block number and so on.
BS	Set of block number and block device number.	Write down on this equipment.
BC	Clear of block number and block device number.	Clear registered value on this equipment.
CR	Set of rate that number of pulses every click.	Write down o on this equipment.
MS	MANUAL operation control.	Write down on this equipment.
RD	Set travel direction.	Write down on this equipment.
LD	Set control state LED.	Write down on this equipment.
DM	Set of speed when power on this equipment.	Write down on this equipment. It'll read when power on this equipment. Initial value is below. S=10000[pps], F=100000[pps], R=200[ms].
OM	Set of return to origin speed when power on this equipment.	Write down on this equipment. It'll read when power on this equipment. Initial value is below. S=10000[pps], F=100000[pps], R=200[ms].
SM	Set number of divide value.	Write down on this equipment. It'll read when power on this equipment. Initial value is 80.
ORGM	Set of method of return to origin.	Write down on this equipment. It'll read when power on this equipment. Initial value is 1.
OPM	Set number of OFFSET value.	Write down on this equipment. It'll read when power on this equipment. Initial value is 0.

NOTE: When stage operating status is busy, if you send other command of

L:, Q:, I:, ?:,SRQ:,*IDN?, command status is NG.

2-5. Command detail

(1) **#CONNECT**: Set of assignment of initial device number.

- Features

It'll assignment of device number start from 1 from near PC.

Until didn't set device number, when send other command of "**IDN?", command status is NG.

- Command format

#CONNECT :

Ex.) #CONNECT: It'll execute assign device number.

Res.) ACK,n

ACK OK (it means success)

NG (it means failure)

n: All of connected number of device (1 to 99)

(2) **CONNECT?**: Check of assignment of initial device number.

- Features

It's command for check already assignment device number.

Device number will automatically assign like from 1 from nearest device(axis) from PC.

Until never set device number, when send other command of "**IDN?", command status is NG.

- Command format

CONNECT?

Ex.) CONNECT? Check for number of connected all devices.

Res.) ACK,n

ACK OK (it means success)

NG (it means failure)

n: (1 to 99) number of connected all devices.

(3) **H command**: Return to mechanical origin

- Features

This command is used to detect the mechanical origin for a stage and set that position as the origin. Once the mechanical origin has been detected, the value displayed will be 0 [pulse].

Move speed can set by OM: command.

When after power on this equipment, the stage will move at the speed specified that set by OM command on this equipment (it'll use the value, when after power on this equipment).

It can get response from device number only 1 (it means nearest stage) whatever operate device number.

NOTE: During stage operating status is Busy, it can't use, and the command status is NG.

NOTE: During all of electromagnetic current off by C command, motorized stages can't move and the command status is NG.

- Command format

H:n

- parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

Ex.) H:D,1 Device number 1.return to mechanical origin.

Res.) D,1,OK

Ex.) H:D,1,2 Device number 1 and 2 return to mechanical origin.

Res.) D,1,2,OK When it has been connecting to 2 stage and it got "OK" response.

Ex.) H:B,1,1 Block device number 1 on block number 1 return to mechanical origin.

Res.) B,1,1,OK

Ex.) H:A Connected all devices return to mechanical origin.

Res.) D,1,2,3,OK When it has been connecting to 3 stage and it got "OK" response.

(4) M command: Set number of pulses for relative travel

- Features

This command is to specify the axis of travel, direction, and the travel (number of relative pulses).

Travel is by means of acceleration/deceleration driving. The distance traveled is specified in pulses.

The stage speed can set speed by D command or value that set on this equipment by DM command (it'll use the value, when after power on this equipment).

It can get response from device number only 1 (it means nearest stage) whatever operate device number.

NOTE: During stage operating status is Busy, it can't use and the command status is NG.

NOTE: During all of electromagnetic current off by C command, motorized stages can't move and the command status is NG.

- Command format

M : n,mx

- parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A
 (aa: Device number / a: Block number / bb: Block device number
 aaaaaa: Serial number / A: connected all devices)
 Refer to figure 2-2-1.

m: + or - +: + direction, -: - direction

x: Range [pulse] (-134,217,728 to 134217727)

Ex.) M:D,1,+10000 Travel to 1000 [pulses] in the + direction on the device number 1.

Res.) D,1,OK

Ex.) M:A,10000 Travel to 1000 [pulses] in the + direction on connected all devices.

Res.) D,1,2,OK When it has been connecting to 2 stage and it got "OK" response.

Ex.) M:D,2,200,1,100 Travel to 200 [pulses] in the + direction on device number 2.
 Travel to 100 [pulses] in the + direction on device number 1.

Res.) D,1,2,OK When it has been connecting to 2 stage and it got "OK" response.

Ex.) M:D,1,10,2,20 Travel to 10 [pulses] in the + direction on device number 1.
 Travel to 20 [pulses] in the + direction on device number 2.

Res.) D,1,2,OK When it has been connecting to 2 stage and it got "OK" response.

(5) MP command: Set number of pulses for relative travel to prebuffer

- Features

This command is to specify the axis of travel, direction, and the travel (number of relative pulses).

Travel is by means of acceleration/deceleration driving. The distance traveled is specified in pulses.

The stage speed can set speed by D command or value that set on this equipment by DM command (it'll use the value, when after power on this equipment).

It'll response after complete moving from each device.

Prebuffer can set value before complete moving.

D command can set speed during executing double buffer mode by MP or AP command.

About set speed more detail,

refer to 『2-3-2. About setting of speed during executing double buffer mode』

NOTE: During stage operating status is Busy, it can't use and the command status is NG.

NOTE: During all of electromagnetic current off by C command, motorized stages can't move and the command status is NG.

NOTE: It can't change to double buffer mode during executing command of normally movement that H, M, A, J, K and E, so it'll response NG.

- Command format

MP : n,mx

- Parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A
 (aa: Device number / a: Block number / bb: Block device number
 aaaaaa: Serial number / A: connected all devices)
 Refer to figure 2-2-1.

m: + or - +: + direction, -: - direction

x: Range [pulse] (-134,217,728 to 134217727)

Ex.)	MP:D,1,+10000	Travel to 1000 [pulses] in the + direction on the device number 1. It'll set to prebuffer.
Res.)	D,1,OK	When device number 1 received command, it'll response "OK".
	D,1,CP	When device number 1 completed moving, it'll response "OK".
Ex.)	MP:A,10000	Travel to 1000 [pulses] in the + direction on connected all devices. It'll set to prebuffer.
Res.)	D,1,2,OK	When device number 1 and 2 received command, it'll response "OK".
	D,2,CP	When device number 2 completed moving, it'll response "OK".
	D,1,CP	When device number 1 completed moving, it'll response "OK". When it has been connecting to 2 stage and it got "OK" response.
Ex.)	MP:D,1,10,2,20	Travel to 10 [pulses] in the + direction on device number 1. Travel to 20 [pulses] in the + direction on device number 2. It'll set to prebuffer.
Res.)	D,1,2,OK	When device number 1 and 2 received command, it'll response "OK".
	D,2,CP	When device number 2 completed moving, it'll response "OK".
	D,1,CP	When device number 1 completed moving, it'll response "OK".

(6) A command: Set number of pulses for absolute travel

- Features

This command is to specify the-axis of travel, direction, and the travel (number of absolute pulses).

Travel is by means of acceleration/deceleration driving. The distance traveled is specified in pulses.

The stage speed can set speed by D command or value that set on this equipment by DM command (it'll use the value, when after power on this equipment).

It can get response from device number only 1 (it means nearest stage) whatever operate device number.

NOTE: During stage operating status is Busy, it can't use and the command status is NG.

NOTE: During all of electromagnetic current off by C command, motorized stages can't move and the command status is NG.

- Command format

A : n,mx

- parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

m: + or - +: + direction, -: - direction

x: Range [pulse] (-134,217,728 to 134217727)

Ex.) A:D,1,+10000 Travel to 10000 [pulses] in the + direction on the device number 1.
It's an absolute position [pulse].

Res.) D,1,OK

Ex.) A:A,10000 Travel to 10000 [pulses] in the + direction on connected all devices.
It's an absolute position [pulse].

Res.) D,1,2,OK When it has been connecting to 2 stage and it got "OK" response.

Ex.) A:B,1,1,10,2,20 Travel to 10 [pulses] in the + direction on block device number 1 of
block number 1.
Travel to 20 [pulses] in the + direction on block device number 2 of
same block number above. It's an absolute position [pulse].

Res.) B,1,1,2,OK

(7) AP command: Set number of pulses for absolute travel to prebuffer

- Features

This command is to specify the-axis of travel, direction, and the travel
(number of absolute pulses).

Travel is by means of acceleration/deceleration driving. The distance traveled is specified in
pulses.

The stage speed can set speed by D command or value that set on this equipment
by DM command (it'll use the value, when after power on this equipment).

It'll response after complete moving from each device.

Prebuffer can set value before complete moving.

D command can set speed during executing double buffer mode by MP or AP command.

About set speed more detail,

refer to 『2-3-2. About setting of speed during executing double buffer mode』

NOTE: During stage operating status is Busy, it can't use and the command status is NG.

NOTE: During all of electromagnetic current off by C command, motorized stages can't move and the command status is NG.

NOTE: It can't change to double buffer mode during executing command of normally movement that H, M, A, J, K and E, so it'll response NG.

• Command format

AP : n,mx

• parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

m: + or - +: + direction, -: - direction

x: Range [pulse] (-134,217,728 to 134217727)

Ex.) AP:D,1,+10000 Travel to 10000 [pulses] in the + direction on the device number 1.

It's an absolute position [pulse].

It'll set to prebuffer.

Res.) D,1,OK When device number 1 received command, it'll response "OK".

D,1,CP When device number 1 completed moving, it'll response "OK".

Ex.) AP:A,10000 Travel to 10000 [pulses] in the + direction on connected all devices.

It's an absolute position [pulse].

It'll set to prebuffer.

Res.) D,1,2,OK When it has been connecting to 2 stage and it got "OK" response.

D,2,CP When device number 2 completed moving, it'll response "OK".

D,1,CP When device number 1 completed moving, it'll response "OK".

Ex.) AP:B,1,1,10,2,20 Travel to 10 [pulses] in the + direction on block device number 1 of block number 1.

Travel to 20 [pulses] in the + direction on block device number 1 of block number 2.

It's an absolute position [pulse].

It'll set to prebuffer.

Res.) B,1,1,2,OK	Travel to 10 [pulses] in the + direction on block device number 1 of block number 1. Travel to 20 [pulses] in the + direction on block device number 2 of same block number above. It's an absolute position [pulse]. It's an absolute position [pulse].
B,1,1,CP	When block device number 1 completed moving, it'll response "OK".
B,1,2,CP	When block device number 2 completed moving, it'll response "OK".

(8) J command: Jog command

• Features

This command drives stages continuously (at a constant speed) at the minimum speed (S)

During move, it can stop by L command or signal of limit sensor.

It can't stop by other command or signal.

The stage speed can set speed by D command or value that set on this equipment speed (S) by DM command (it'll use the value, when after power on this equipment).

It can get response from device number only 1 (it means nearest stage) whatever operate device number.

NOTE: During stage operating status is Busy, it can't use and the command status is NG.

NOTE: During all of electromagnetic current off by C command, motorized stages can't move and the command status is NG.

• Command format

J : n,m

• parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A
(aa: Device number / a: Block number / bb: Block device number
aaaaaa: Serial number / A: connected all devices)
Refer to figure 2-2-1.

m: + or - +: + direction, -: - direction

Ex.) J:D,1+	Move in the + direction on the device number 1.
Res.) D,1,OK	
Ex.) J:A-	Move in the - direction on connected all devices.
Res.) D,1,2,OK	When it has been connecting to 2 stage and it got "OK" response.
Ex.) J:B,1,1,+,2,-	Move in the + direction on block device number 1 of block number 1. Move in the - direction on block device number 1 of block number 2.

Res.) B,1,1,OK

B,1,2,OK

(9) K command: Linear interpolation movement command

• Features

This command indicates a designation of axis of movement and a designation of relative movement in order to operate linear interpolation movement.

Operation of linear interpolation movement can designate up to arbitrary 2 axes.

This command drives stages continuously (at a constant speed).

NOTE: Long travel device number (main device number) side speed is use value that setting speed on this command.

Short travel device number side travel speed value is calculated by linear interpolation.

NOTE: When operate stage, have to use only block number and device number on block.

If use other method, it'll NG (failure).

When you use block number, you have to set block number and block device number by BS command before use it.

NOTE: It can get response from device number only 1(it means nearest stage) whatever operate device number.

NOTE: During stage operating status is Busy, It can't use and the command status is NG.

NOTE: During all electromagnetic current off by C command, motorized stages can't move and the command status is NG.

• Command format

K : n,a,b,mx,my,spd

• parameter

n:	Block number (1 to 8)
a	Block device number for use axis1 on linear interpolation (1 to 8)
b	Block device number for use axis2 on linear interpolation (1 to 8)
m:	+ or - +: + direction, -: - direction. when there aren't "m", + direction.
x	Travel value of axis1 (number of pulses) Range [pulse] (-134,217,728 to 134217727)
	Travel value of axis2 (number of pulses) Range [pulse] (-134,217,728 to 134217727)
spd	Long travel side device number (main device number) speed [pps] Speed range [pps] (1 to 800000)

Ex.) K:B,1,1,2,+10000,+20000,10000

Block number is 1.

Block device number for use axis1 on linear interpolation is 1.

Block device number for use axis2 on linear interpolation is 2.

Travel value of axis1 is 10000 [pls] in + direction.

Travel value of axis2 is 20000 [pls] in + direction.

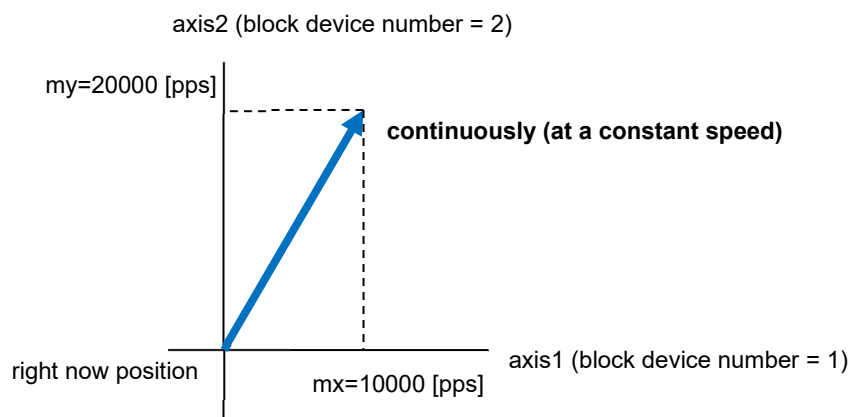
Long travel side device number (main device number) is 2.

Because travel value of axis2 is longer than travel value of axis1.

Long travel side device number (main device number) speed is 10000 [pps].

It drives stages continuously (at a constant speed).

Res.) D,1,OK



(10) E command: Linear interpolation movement command

• Features:

This command for arc interpolation movement enables to specify operation axis and rotation direction in arc interpolation movement with ended position and center position.

It can easily drive arc interpolation movement with arbitrary 2 axes.

It drives stages continuously (at a constant speed) on each other axis.

NOTE: When operate stage, have to use only block number and device number on block.

If use other method, it'll NG (failure)

When you use block number, you have to set block number and block device number by BS command before use it.

NOTE: It can get response from device number only 1(it means nearest stage) whatever operate device number.

NOTE: During stage operating status is Busy, it can't use and the command status is NG.

NOTE: During all electromagnetic current off by C command, motorized stages can't move and the command status is NG.

NOTE: Set same value on each other axes DIVIDE in arc interpolation.

• Command format

E : n,a,b,c,mxe,mye,myc,myc,spd

• parameter

n:	Block number (1 to 8)
a	Block device number for use axis1 in arc interpolation (1 to 8)
b	Block device number for use axis2 in arc interpolation (1 to 8)
c	0 or 1 rotation direction 0 is CW rotation (Clockwise), 1 is CCW rotation (Counterclockwise)
m:	+ or - +: + direction, -: - direction. when there aren't "m", + direction.
xe	Ended position of axis1 (number of pulses). Range [pulse] (-134,217,728 to 134217727).
ye	Ended position of axis2 (number of pulses). Range [pulse] (-134,217,728 to 134217727).
xc	Center position of axis1 (number of pulses). Range [pulse] (-134,217,728 to 134217727).
yc	Center position of axis2 (number of pulses). Range [pulse] (-134,217,728 to 134217727).
spd	Each other axis speed [pps]. Speed range [pps] (1 to 800000).

Ex.) E:B,1,1,2,0,+100,+100,+100,+0,20000

Block number is 1.

Block device number for use axis1 in arc interpolation is 1.

Block device number for use axis1 in arc interpolation is 2.

Rotation is CW(Clockwise).

Ended position axis1, axis2(number of pulses) is (100 [pulse], 100 [pulse]).

Center position axis1, axis2(number of pulses) is (100 [pulse], 0 [pulse]).

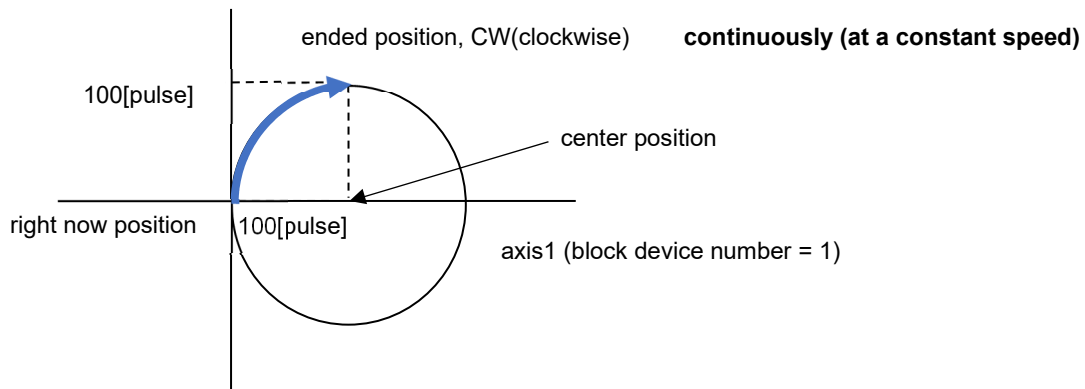
Each other axis (axis1, axis2) speed is 20000 [pps].

It drives stages continuously (at a constant speed).

In this case, this moving looks like 90 [degree] in CW direction.

Res.) D,1,OK

axis2 (block device number = 2)



(11) L command: Decelerate and stop command

- Features

When this command is executed, the stage decelerates and stops.

- Command format

J : n

- parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

Ex.) L:D,1+

Device number 1 will decelerates and stops.

Res.) D,1,OK

Ex.) L:A-

Connected all devices will decelerates and stops.

Res.) D,1,OK

D,2,OK

...

D,10,OK

When it has been connecting to 10 stage and it got "OK" response.

Ex.) L:B,1,1,2

Block device number 1 and 2 on block number 1 will decelerates and stops.

Res.) B,1,1,OK

B,1,1,OK

(12) LE command: Stop like immediately command

• Features

When this command is executed, the stage stops immediately

NOTE: Operate axes parameter is only A that means connected all devices.

When use other operate axes parameter, status will NG.

• Command format

LE : A

• parameter

A: connected all devices

Refer to figure 2-2-1.

Ex.) LE : A All of connected device will stop immediately.

Res.) D,1,OK

D,2,OK

...

D,10,OK When it has been connecting to 10 stage and it got "OK" response.

(13) R command: Set electronic (logical) origin

• Features

This command is used to set electronic (logical) origin to the current position of each-axis.

When power on this equipment, current position is electronic (logical) origin on it.

NOTE: During stage operating status is Busy, it can't use and the command status is NG.

NOTE: During all of electromagnetic current off by C command, motorized stages can't move and the command status is NG.

• Command format

R : n

• parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

Ex.) R:D,1+ Current position of device number 1 will become to electronic (logical) origin. (0 [pulse]).

Res.) D,1,OK

Ex.) R:A Current position of connected all devices will become to electronic (logical) origin. (0 [pulse]).

Res.) D,1,OK

D,2,OK

D,3,OK

When it has been connecting to 3 stage and it got "OK" response.

Ex.) R:B,1,1,2

Current position of device number 1 and 2 on block number 1 will

become to electronic (logical) origin. (0 [pulse]).

Res.) B,1,1,OK

B,1,2,OK

(14) D command: Speed settings

- Features

The minimum speed (S), maximum speed (F), and acceleration/deceleration time (R) are set from this equipment when the power is turned on. This command can set speed during continue to power on this equipment.

This command can't register speed on this equipment.

When you would like to register speed, use DM command (when after power on use it).

NOTE: During stage operating status is Busy, it can't use and the command status is NG.

- Command format

D : n,spds,spdf,r

- parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

spds: Minimum speed (S)

Speed range [pps] (1 to 800000)

Note: The minimum speed (S) must be less than or equal to the maximum speed (F).

spdf: Maximum speed (F)

Speed range [pps] (1 to 800000)

r: Acceleration/deceleration time (R)

Time range [ms] (1 to 1000)

Ex.) D:D,1,200,2000,100

Set speed like below values on device number 1.

(S=200 [pps], F=2000 [pps], R=100 [ms]) on device number 1.

Res.) D,1,OK

D,2,OK

D,3,OK

When it has been connecting to 3 stage and it got "OK" response.

Ex.) D:B,1,1,200,2000,100,2, 200,2000,100

Set to speed like below values on device number 1 and 2

on block device number 1.

(S=200 [pps], F=2000 [pps], R=100 [ms])

Res.) B,1,1,OK

B,1,2,OK

(15) C command: Free/ hold motor (Excitation ON/OFF)

- Features

This command is used to excite the motor or to turn excitation off.

NOTE: During stage operating status is Busy, it can't use, and the command status is NG.

- Command format

C : n,b

- parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

b: 0 or 1 0: electromagnetic current off, 1: electromagnetic current on

Ex.) C:D,1,0

Set electromagnetic current off of device number 1.

Res.) D,1,OK

Ex.) C:D,A,1

Set electromagnetic current off of connected all devices.

Res.) D,1,OK

D,2,OK

D,3,OK

When it has been connecting to 3 stage and it got "OK" response.

Ex.) C:B,1,1,0,2,1

Set electromagnetic current off of device number 1 on block number 1.

Set electromagnetic current on of device number 2 on block number 1.

Res.) B,1,1,OK

B,1,2,OK

(16) Q command: Get of Status 1

• Features

It can get current position [pulse]

NOTE: Position value display from left side until ten text on maximum that include $\pm$ direction.

Number of texts is variable.

NOTE: When direction is -, it'll display.

When direction is +, it'll not display. refer to below Ex.).

• Command format

Q : n

• parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

Ex.) Q:D,1

Res.) D,1,-1000 Current position of device number 1 is -1000.

Ex.) Q:A

Res.) D,1,-1000 Current position of device number 1 is -1000.

D,2,1000 Current position of device number 2 is 1000.

D,3,3000 Current position of device number 3 is 3000.

When it has been connecting to 3 stage.

(17) SRQ command: Get of Status 2

• Features

It can get moving status and error information.

• Command format 1)

SRQ:n

• Parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

NOTE: When you input assign method, it can't use "A" and "B,A".

Ex.) SRQ:D,1

Res.) D,1,X,C,K,R In case of status information of device number 1.

Ex.) SRQ:B,1,1

Res.) B,1,1,K,C,K,R In case of status information of block device number 1 on block number 1.

Ex.) SRQ:S,111111

Res.) S,111111,1,K,C,K,R

In case of status information of serial number 111111.

↓

S,111111,ACK1,ACK2,ACK3,ACK4

Like above ACK1, ACK2, ACK3 and ACK4 are common of response on all formats.

NOTE: Like above ACK response is separated by “,” (comma).

• Common of response

ACK1	X	Error of command
	K	Command received normally.
ACK2	C	It was stopped by CW limit sensor detected.
	W	It was stopped by CCW limit sensor detected.
	E	It was stopped by both of limit sensor. CW and CCW detected.
ACK3	K	Normal stop.
	K	Non alarm.
	E	Alarm on kind of hardware.
ACK4	C	Alarm on kind of connect.
	B	(Busy) It's busy right now. It has been moving stage right now. But now it can react command of “L”, “Q”, “SRQ”, “!”, “?”, “ and “*IDN?”.
	R	(Ready) It's ready right now. It hasn't been moving stage right now. It can react all of command.

(18) ! command: Get of Status 3

• Features

It can get information that Busy or Ready on ACK3.

• Command format

! : n

- parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

Ex.) !:D,1

Res.) D,1,ACK3

Ex.) !:A

Res.) D,1,ACK3

D,2,ACK3

D,3,ACK3

...

D,10,ACK3

When it has been connecting to 10 stage and it got "OK" response.

(19) *IDN? command: Get of equipment information

- Features

It can get equipment information from stage.

- Command format

*IDN?

- parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

NOTE:

Before send #CONNECT, command you can send *IDN? Command only.

Before send #CONNECT command, If you send *IDN? command, you can't receive like response "2,OK" and so on.

After send *IDN? command, device number will be assigned automatically.

And you can send *IDN?:n command format too.

NOTE: Like above ACK response is separated by "," (comma).

Ex.) *IDN?

Res.) D,1,ACK5,ACK6,ACK7,ACK8

D,2,ACK5,ACK6,ACK7,ACK8

D,3,ACK5,ACK6,ACK7,ACK8

ACK5	Vender name	Ex.) SIGMAKOKI
ACK6	Equipment name	Ex.) SBI26-50X
ACK7	Serial number	Ex.) 00001
ACK8	FW version	Ex.) V1.00.001

Ex.) *IDN?:D,1

Res.) D,1,ACK5,ACK6,ACK7,ACK8

ACK5	Vender name	Ex.) SIGMAKOKI
ACK6	Equipment name	Ex.) SBI26-50X
ACK7	Serial number	Ex.) 00001
ACK8	FW version	Ex.) V1.00.001

(20) ? command: Get of equipment internal information

- Features

It can get equipment internal information from stage.

- Command format

? : n,p

- parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A
 (aa: Device number / a: Block number / bb: Block device number
 aaaaaa: Serial number / A: connected all devices)
 Refer to figure 2-2-1.

p: Refer to below table

Table 2-5-1 : List of ? Commands

parameter	response	example
VENDER	Vender name	SIGMAKOKI
N	Equipment name	SBIS26-50
SN	Serial number	00001
V	FW version	V1.00.001
B	Block number, block device number.	1,1
CR	Every click by set number of pulses.	1

parameter	response	example
C	State of electromagnetic current.	0 or 1 Electromagnetic current 0:OFF、1 : ON
D	Move speed minimum S[pps], maximum F[pps], acceleration/deceleration time [ms].	10000,100000,200
DM	It'll read when power on this equipment. Move speed minimum S[pps], maximum F[pps], acceleration/deceleration time [ms] This value has been registering on this equipment.	10000,100000,200
O	Move speed for Return to mechanical origin minimum S[pps], maximum F[pps], acceleration/deceleration time [ms].	10000,100000,200
OM	It'll read when power on this equipment. Move speed for return to mechanical origin. minimum S[pps], maximum F[pps], acceleration/deceleration time [ms] This value has been registering on this equipment.	10000,100000,200
S	Divide value	80
SM	It'll read when power on this equipment. Divide value that has been registering on this equipment.	80
RD	Set travel direction.	0 or 1 0:POS,1:NEG
ORG	Set of method of return to origin.	0~4 0: Not return origin 1:MINI 2:MINI_PLUS 3:Median point detection (CENTER method) 4:ORGS

parameter	response	example
ORGM	It'll read when power on this equipment. Set of method of return to origin. This value has been registering on this equipment.	0~4 0: Not return to origin 1:MINI 2:MINI_PLUS 3:Median point detection 4:ORGS
OP	OFFSET pulse	0~60000
OPM	It'll read when power on this equipment. OFFSET pulse. This value has been registering on this equipment.	0~60000
MS	MANUAL operation control This value has been registering on this equipment.	0 or 1 0 : ON (can use it) 1 : OFF (can't use it)
LD	Control state LED This value has been registering on this equipment.	0 or 1 0 : ON (use it) 1 : OFF (don't use it)
MP	Number set of pulses for relative travel on prebuffer. [pulse] (Value that it was set to prebuffer)	D,1,1000 D,2,2000 In case of didn't set it yet or empty, it's a below. D,1,N D,2,N
AP	Number set of pulses for absolute travel on prebuffer. [pulse] (Value that it was set to prebuffer)	D,1,1000 D,2,2000 In case of didn't set it yet or empty, it's a below. D,1,N D,2,N

Ex.) ? :D,1,SM

DIVIDE value of device number 1 registered on this equipment.

Res.) D,1,80

It means DIVIDE value is 80 that device number 1 registered on this equipment.

Ex.) ? :A,ORG Method of return to origin of all connected device.

Res.) D,1,1 It means method of return to origin of device number 1 is (1: MINI).

D,2,1 It means method of return to origin of device number 2 is (1: MINI).

When it has been connecting to 2 stage and it got "OK" response.

(21) BS command: Set to block number and block device number

• Features

It's command for set to block number and block device number.

It'll write down on this equipment.

NOTE: During stage operating status is Busy, It can't use and the command status is NG.

NOTE: you can set same block device number on difference each block number.

So, please take care of yourself, when you set it.

• Command format

BS : n,a,bb

• Parameter

n: D,aa / S,aaaaaa
(aa: Device number / aaaaaa: Serial number)

Refer to figure 2-2-1.

a: Block number that would like to set (1 to 8).

bb: Block device number that would like to set (1 to 8).

Ex.) BS:D,1,1,1 Case of device number 1 set to block device number 1 on block number 1.

Res.) D,1,OK

Ex.) BS:S,000001,1,2 Case of serial number "000001" set to block device number 2.
on block number 1.

Res.) S,000001,OK

(22) BC command: Clear for block number and block device number

• Features

It's command for clear for block number and block device number.

It'll write down on this equipment.

NOTE: During stage operating status is Busy, It can't use and the command status is NG.

• Command format

BC : n

- Parameter

n: D,aa / S,aaaaaa / A

(aa: Device number / aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

NOTE: When you input assign method, it can't use "B,a,bb" and "B,A".

It means you can't use assign method by block number, block device number and all of block device number in a block.

Ex.) BC:D,1, Case of device number 1 clear for block device number 1
on block number 1.

Res.) D,1,OK

Ex.) BC:A Case of clear assign number for connected all devices clear for
block number and block device number.

Res.) D,1,OK

D,2,OK

D,3,OK When it has been connecting to 3 stage and it got "OK" response.

(23) CR command: Set to rotary encoder click rate

- Features

CLICK mode is when turn knob, it'll move every click by set number of pulses by this command.

It'll write down on this equipment.

NOTE: During stage operating status is Busy, It can't use and the command status is NG.

- Command format

CR : n,a

- parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

a: 1~40000 number of pulses per a click [pulse]

Ex.) CR:D,1,100 Move pulse of device number 1 every 1 click value set to
100 [pulses].

Res.) D,1,OK

Ex.) CR:A,100 Move pulse of connected all devices every one click value set to 100 [pulses].

Res.) D,1,OK

D,2,OK

D,3,OK

When it has been connecting to 3 stage and it got "OK" response.

(24) MS command: Set to MANUAL mode

- Features

It can set MANUAL mode use or not use.

It'll write down on this equipment. Initial value is 0 (ON).

It means you can use MANUAL operation by Knob.

NOTE: During stage operating status is Busy, It can't use and the command status is NG.

- Command format

MS : n,d

- Parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

d: 0 can use MANUAL mode ON

1 can't use MANUAL mode OFF

Ex.) MS:D,1,1 Set to device number 1 can't use MANUAL mode.

Res.) D,1,OK

Ex.) MS:A,1

Set to connected all devices can't use MANUAL mode.

Res.) D,1,OK

D,2,OK

D,3,OK

When it has been connecting to 3 stage and it got "OK" response.

(25) RD command: Set to travel direction

• Features

It can set travel direction.

when you change direction by this command, limit sensor direction (+/-) will change too.

It'll write down on this equipment. Initial value is 0 (POS).

POS means + direction.

NOTE: During stage operating status is Busy, It can't use and the command status is NG.

• Command format

RD : n,d

• Parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

d: 0 POS (side of motor is + direction)

1 NEG (opposite side of motor is - direction)

Ex.) RD:D,1,1 Set to device number 1 direction set NEG.

Res.) D,1,OK

Ex.) RD:A,0 Set to connected all devices direction set POS.

Res.) D,1,OK

Res.) D,2,OK

When it has been connecting to 2 stage and it got "OK" response.

(26) LD command: Set to control state LED

• Features

It can set travel direction.

It'll write down on this equipment. Initial value is 0 (ON).

NOTE: During stage operating status is Busy, It can't use and the command status is NG.

• Command format

LD : n,d

- Parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A
 (aa: Device number / a: Block number / bb: Block device number
 aaaaaa: Serial number / A: connected all devices)
 Refer to figure 2-2-1.

d: 0 ON
 1 OFF

Ex.) LD:D,1,0 Set to device number 1 device control state LED for use.
 Res.) D,1,OK

Ex.) RD:A,0 Set to connected all devices control state LED for use.
 Res.) D,1,OK
 D,2,OK

When it has been connecting to 2 stage and it got "OK" response.

(27) DM command: Speed settings (It'll read, when turn on controller)

- Features

The minimum speed (S), maximum speed (F), and acceleration/deceleration time (R) are set from this equipment when the power is turned on.

This command can register speed on this equipment.

Initial value is S=10000[pps], F=100000[pps], and R=200[ms].

NOTE: During stage operating status is Busy, it can't use and the command status is NG.

- Command format

DM : n,spds,spdf,r

- parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A
 (aa: Device number / a: Block number / bb: Block device number
 aaaaaa: Serial number / A: connected all devices)
 Refer to figure 2-2-1.

spds: Minimum speed (S)
 Speed range [pps] (1 to 800000)

Note: The minimum speed (S) must be less than or equal to the maximum speed (F).

spdf: Maximum speed (F)
 Speed range [pps] (1 to 800000)

r: Acceleration/deceleration time (R)
 Time range [ms] (1 to 1000)

Ex.) DM:D,1,200,2000,100

The value of device number 1 speed set below,
when after power on this equipment.

(S=200 [pps], F=2000 [pps], R=100 [ms]) on device number 1.

Res.) D,1,OK

Ex.) DM:A,1,200,2000,100

The value of connected all devices speed set below,
when after power on this equipment.

(S=200 [pps], F=2000 [pps], R=100 [ms]) on device number 1.

Res.) D,1,OK

D,2,OK

When it has been connecting to 2 stage and it got "OK" response.

Ex.) DM:B,1,1,200,2000,100,2, 200,2000,100

The value of device number 1 and 2 on block device number 1
speed set below, when after power on this equipment.

(S=200 [pps], F=2000 [pps], R=100 [ms])

Res.) B,1,1,OK

B,1,2,OK

(28) OM command: return to origin speed settings (It'll read, when turn on controller)

• Features

The minimum speed (S), maximum speed (F), and acceleration/deceleration time (R) are set from this equipment when the power is turned on.

This command can't register return to origin speed on this equipment.

Initial value is S=10000[pps], F=100000[pps], and R=200[ms].

NOTE: During stage operating status is Busy, it can't use and the command status is NG.

NOTE: During all of electromagnetic current off by C command, motorized stages can't move and the command status is NG.

• Command format

OM : n,spds,spdf,r

• parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

spds: Minimum speed (S)

Speed range [pps] (1 to 800000)

Note: The minimum speed (S) must be less than or equal to the maximum speed (F).

spdf: Maximum speed (F)
Speed range [pps] (1 to 800000)
r: Acceleration/deceleration time (R)
Time range [ms] (1 to 1000)

Ex.) OM:D,1,200,2000,100

The value of device number 1 return to origin speed set below,when after power on this equipment.

(S=200 [pps], F=2000 [pps], R=100 [ms]) on device number 1.

Res.) D,1,OK

Ex.) OM:A,200,2000,100

The value of connected all devices return to origin speed set below, when after power on this equipment.

(S=200 [pps], F=2000 [pps], R=100 [ms])

Res.) D,1,OK

D,2,OK

When it has been connecting to 2 stage and it got "OK" response.

Ex.) OM:B,1,1,100,1000,200,2, 100,1000,200

Device number 1 and 2 on block device number 1 speed for return to origin set below, when after power on this equipment.

(S=200 [pps], F=2000 [pps], R=100 [ms])

Res.) B,1,1,OK

B,1,2,OK

When it has been connecting to 2 stage and it got "OK" response.

(29) SM command: Set to number of divides

- Features

It can set number of divides on motor moving.

It'll use the value, when after power on this equipment.

Initial value is 80.

NOTE: During stage operating status is Busy, it can't use, and the command status is NG.

- Command format

SM : n,d

- Parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

d: 1 / 2 / 4 / 5 / 8 / 10 / 20 / 25 / 40 / 50 / 80 / 100 / 125 / 200 / 250

Ex.) SM:D,1,20 Set to device number 1 divide 20.

Res.) D,1,OK

Ex.) SM:A,25 Set to device number 1 divide 25.

Res.) D,1,OK

D,2,OK

When it has been connecting to 2 stage and it got "OK" response.

(30) ORGM command: Set to method of return to origin

- Features

It can set method of return to origin.

It'll write down on this equipment. Initial value is (1: MINI).

NOTE: During stage operating status is Busy, it can't use and the command status is NG.

- Command format

ORGM : n,d

- Parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A
 (aa: Device number / a: Block number / bb: Block device number
 aaaaaa: Serial number / A: connected all devices)
 Refer to figure 2-2-1.

d: 0~4

0	Not return origin
1	MINI method
2	MINI_PLUS method
3	Median point detection method (CENTER method)
4	ORGS method

Refer to below method.

Ex.) ORGM:D,1,4 Set to device number 1 method of return to origin for (4: ORGS).

Res.) D,1,OK

Ex.) ORGM:A,1 Set to connected all devices method of return to origin for (1: MINI).

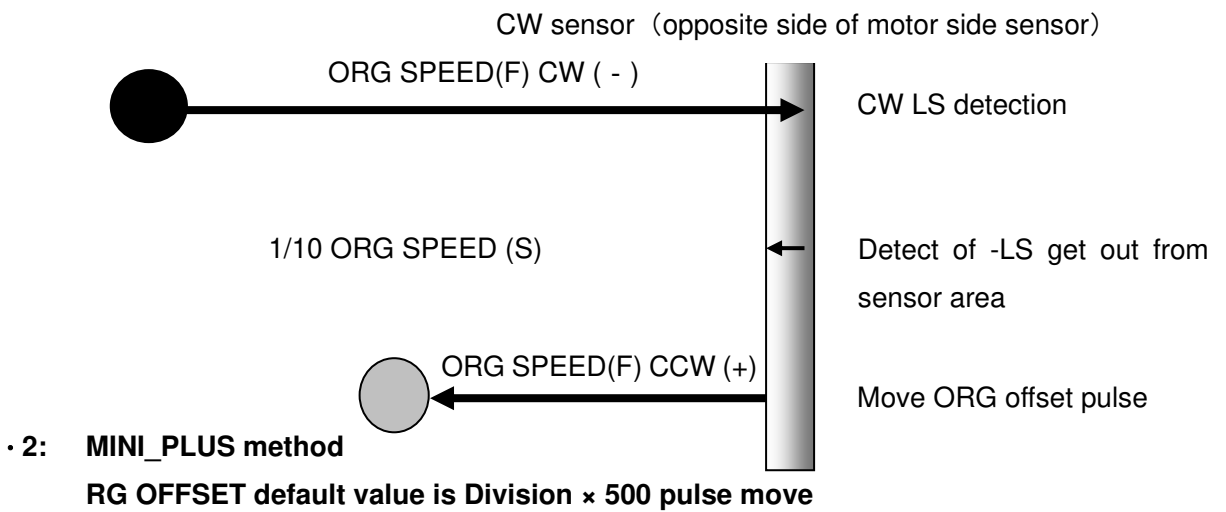
Res.) D,1,OK

D,2,OK

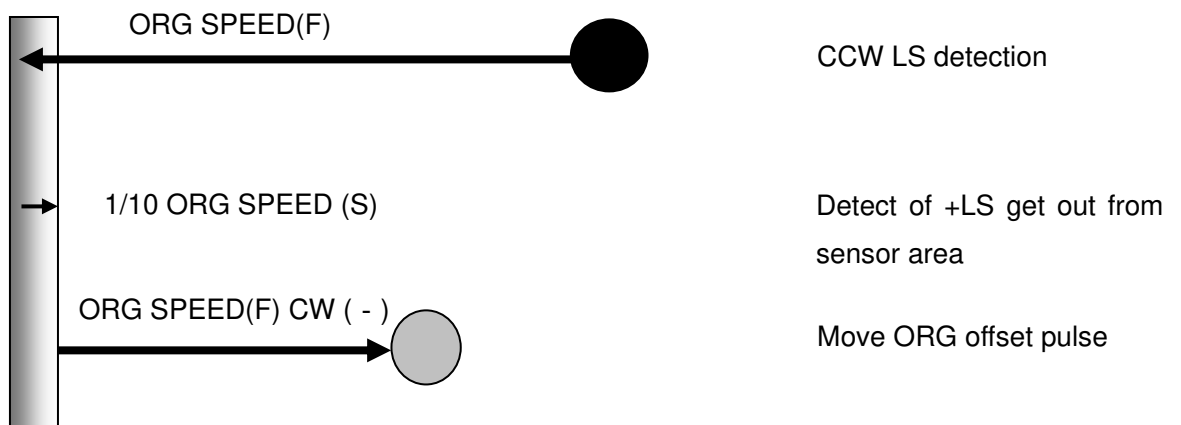
When it has been connecting to 2 stage and it got "OK" response.

• 1: **MINI method**

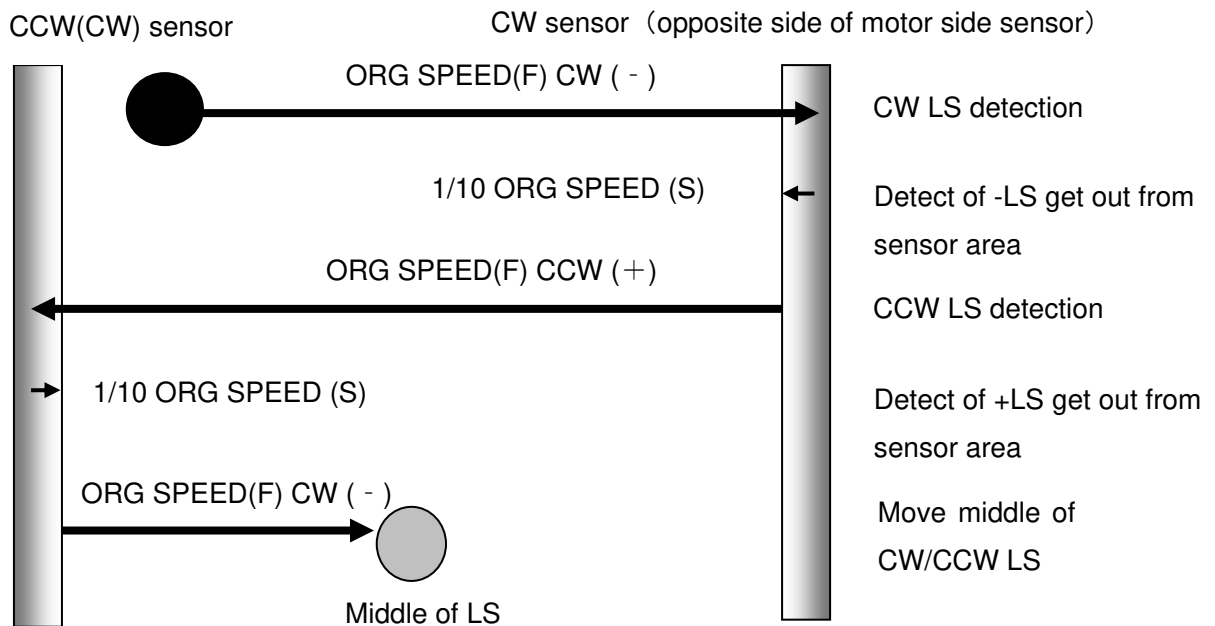
Initial value of ORG OFFSET is $500[\text{pls}] \times \text{DIVIDE}$



CCW(CW) Sensor

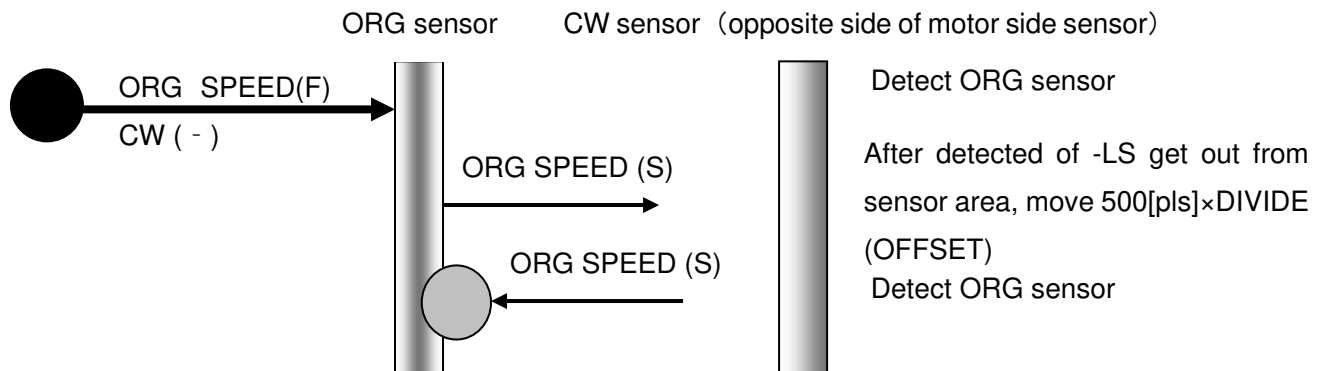


• 3: median point detection method (CENTER method)

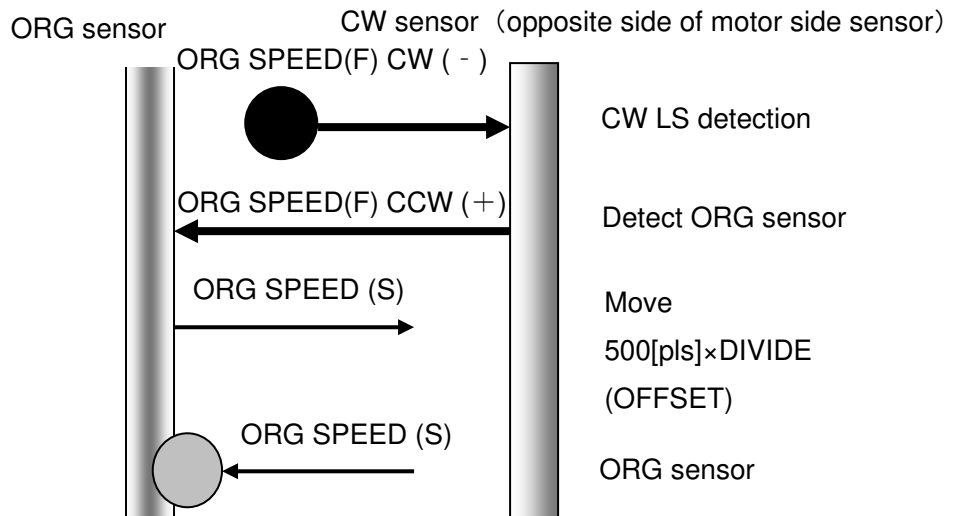


• 4: ORGS method

2-5-1) In case that ORG sensor is set on the inside of CW(CCW) sensor



2-5-2) In case that ORG sensor is set beyond limit SW toward CW direction.



Caution1) In case that after detect CW (CCW) sensor, stage move toward CCW direction and then can't detect ORG sensor (in case of no ORG sensor), stage stop at CCW (CW) sensor position.

(31) OPM command: Set to number of offset pulses

- Features

It can set number of offset pulses that use when return to origin.

It'll write down on this equipment. Initial value is 0 (DIVIDE × 500 [pulse]).

NOTE: During stage operating status is Busy, It can't use and the command status is NG.

- Command format

OPM : n,d

- Parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

d: 0~60000

0:

OFFSET [pulse] is DIVIDE × 500 [pulse].

1~60000 :

OFFSET [pulse] is d × 100 [pulse].

Ex.) OPM:D,1,1000 Set to device number 1 OFFSET to 100000 [pulse]. (1000×100[pulse])

Res.) D,1,OK

Ex.) OPM:A,2000 Set to connected all devices OFFSET to 200000 [pulse].
(2000×100[pulse])

Res.) D,1,OK

D,2,OK

When it has been connecting to 2 stage and it got "OK" response.

Ex.) OPM:A,0 Set to connected all devices OFFSET to 12500 [pulse].
(DIVIDE = 25, 25×500[pulse])

Res.) D,1,OK

D,2,OK

When it has been connecting to 2 stage and it got "OK" response.

(32) GCP command: Clear number of pulses for relative / absolute movement on prebuffer

- Features

It's a command kind of clear for number of pulses for relative / absolute movement on prebuffer by MP or AP command.

NOTE: During all of electromagnetic current off by C command, motorized stages can't move and the command status is NG.

- Command format

GCP:n

- Parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A
(aa: Device number / a: Block number / bb: Block device number
aaaaaa: Serial number / A: connected all devices)
Refer to figure 2-2-1.

Ex.) GCP:D,1 Clear prebuffer of device number 1.

Res.) D,1,OK

(33) WT command: Set wait time to prebuffer

- Features

It's command that during set to prebuffer, it can set wait time for after execute value of execute buffer.

If set wait time 0 by WT command like WT:0, executing timer will stop.

In this case, if prebuffer has value, prebuffer value will execute.

NOTE: During all of electromagnetic current off by C command, motorized stages can't move and the command status is NG.

- Command format

WT : n,w

- Parameter

n: D,aa / B,a,bb / B,a,A / S,aaaaaa / A

(aa: Device number / a: Block number / bb: Block device number

aaaaaa: Serial number / A: connected all devices)

Refer to figure 2-2-1.

Ex.) WT:D,1,1

Set 0.1 [s] waiting time on device number 1.

Res.) D,1,OK

Ex.) WT:D,1,0

Set waiting time will stop on device number 1.

Res.) D,1,OK

Chapter 3: Specification

3-1. Specification

3-1-1. General specifications

Power Supply	DC24 ± 5 [%] [V]	
	1.0[A] < Z type >	
	0.8[A] < X type >	
Operating temperature	5 to 40 [°C]	
Storage temperature	-20 to 60 [°C]	
Ambient humidity	20 to 80 [%RH] (no condensation)	
Altitude	up to 2000 [m]	
Indoor use only		
Installation category	II	
Pollution degree	2	
External Dimensions and weight		
(excluding projections)		
< X type >	SBIS26-35X-M6,INCH	306.5[mm] x 136.8[mm] x 36.0[mm] 3.0[kg]
	SBIS26-50X-M6,INCH	321.5[mm] x 136.8[mm] x 36.0[mm] 3.0[kg]
	SBIS26-100X-M6,INCH	371.5[mm] x 136.8[mm] x 36.0[mm] 3.7[kg]
	SBIS26-200X-M6,INCH	471.5[mm] x 136.8[mm] x 36.0[mm] 4.65[kg]
	SBIS26-300X-M6,INCH	571.5[mm] x 136.8[mm] x 36.0[mm] 5.60[kg]
< Z type >	SBIS26-35Z-M6,INCH	352.5[mm] x 136.8[mm] x 36.0[mm] 5.85[kg]
	SBIS26-50Z-M6,INCH	360.0[mm] x 136.8[mm] x 36.0[mm] 5.85[kg]
	SBIS26-100Z-M6,INCH	410.0[mm] x 136.8[mm] x 36.0[mm] 6.55[kg]
	SBIS26-200Z-M6,INCH	510.0[mm] x 136.8[mm] x 36.0[mm] 9.5[kg]
	SBIS26-300Z-M6,INCH	610.0[mm] x 136.8[mm] x 36.0[mm] 10.45[kg]

3-1-2. Performance

Maximum driving speed (F)	1 to 800 [kPPS]
Minimum driving speed (S)	1 to 800 [kPPS]
Acceleration/deceleration time (R)	1 to 1000 [ms]
Method of return to origin	Not return to origin / MINI method / MINI_PLUS method / Median point detection method / ORGS method (You can change above method of ORG by OM command)
Interface	RS232C interface Communication Parameters - Baud rate 38400 [bps] - Data bits 8 bits - Parity None - Stop bit 1 bit - Flow control none - Delimiters CR+LF

(3) Driver Specifications

Drive motor	Five-phase stepping motor
Division (micro-step) settings	1, 2, 4, 5, 8, 10, 20, 25, 40, 50, 80, 100, 125, 200, 250 divisions

(4) Electrical fast transmit/burst immunity EN61000-4-4 (2012) Level2

(5) Electrostatic discharge EN61000-4-2 (2009) Level2.

3-2. Connector pin assign

3-2-1. Communication (IN) I/F spec (pin assign) (COM IN connector)

Gray area means output signal

Pin number	Signal	Pin number	Signal
1	RXD	6	V+
2	TXD	7	V+
3	SYNC start	8	V-
4	FG	9	V-
5	V+	10	V-

HR10A-10R-10PC (71) (HIIROSE Electric products) Equivalent used

3-2-2. Communication (OUT) I/F spec (pin assign) (COM OUT connector)

Gray area means output signal

Pin number	Signal	Pin number	Signal
1	TXD	6	V+
2	RXD	7	V+
3	SYNC start	8	V-
4	FG	9	V-
5	V+	10	V-

HR10A-10R-10SC (71) (HIIROSE Electric products) Equivalent used

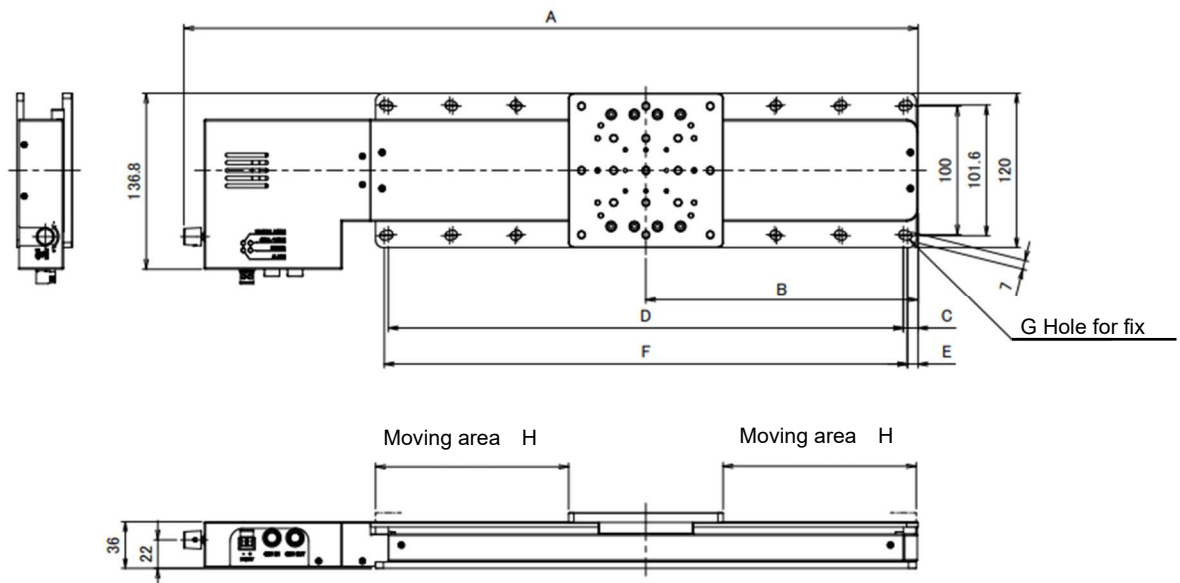
3-2-3. Power supply I/F spec (pin assign)

Pin number	Signal	Pin number	Signal
1	GND	2	+24[V]

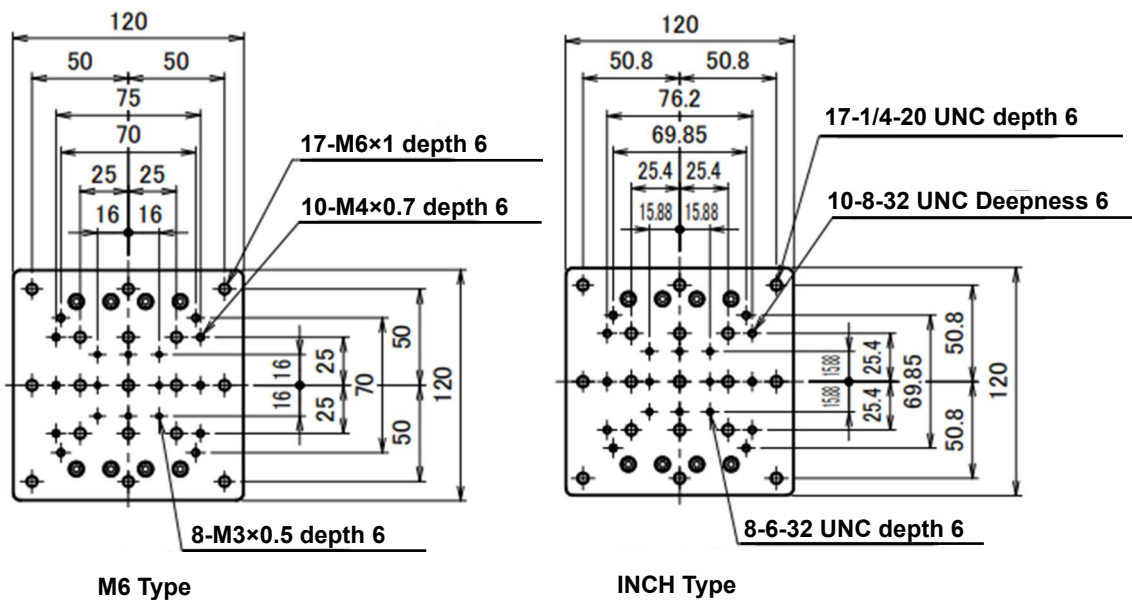
Connector MSTBA 2,5 HC/ 2-G (PHOENIX CONTACT products) Equivalent used

3-3. Exterior dimensions

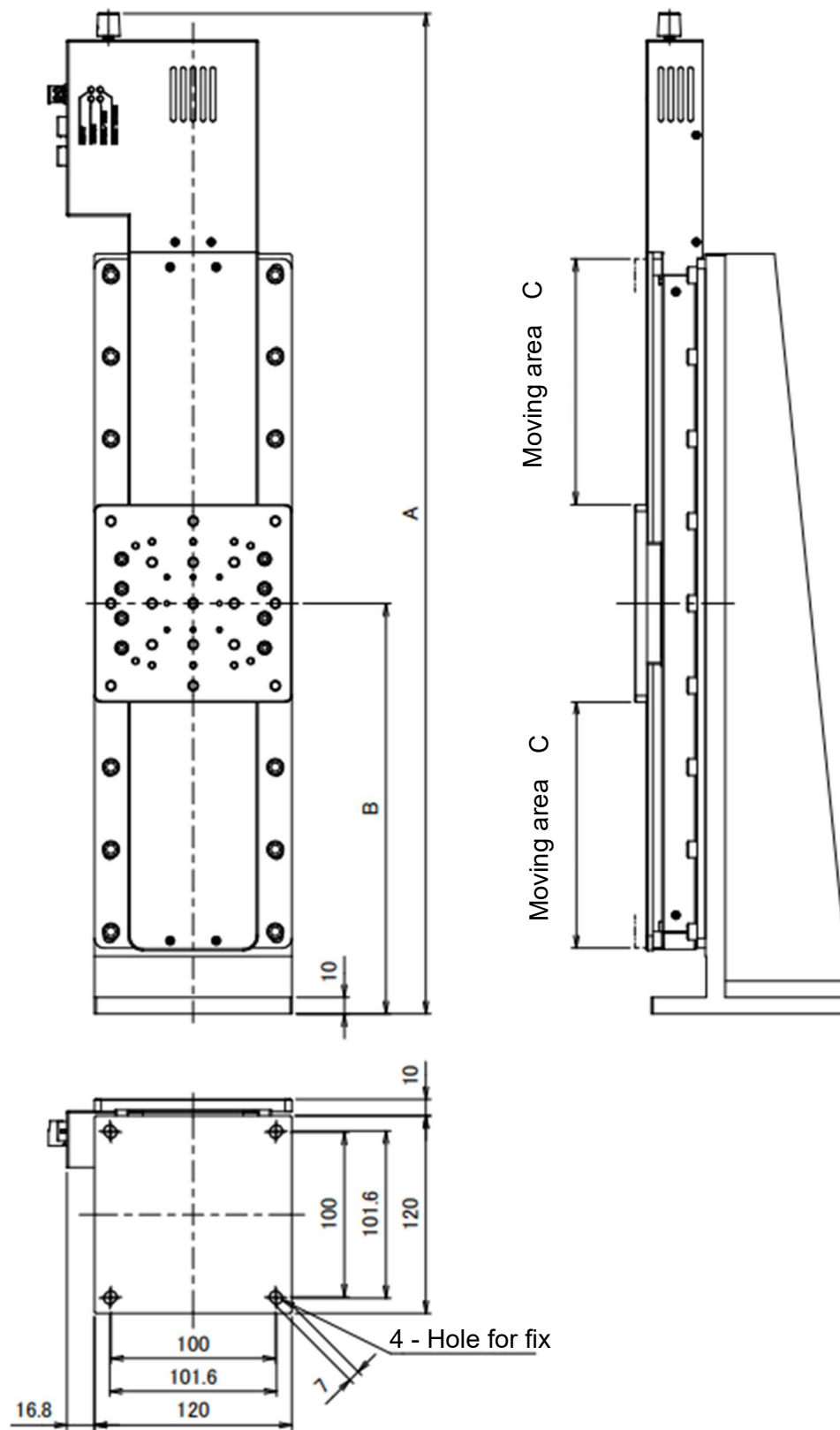
(1) X type Outlines



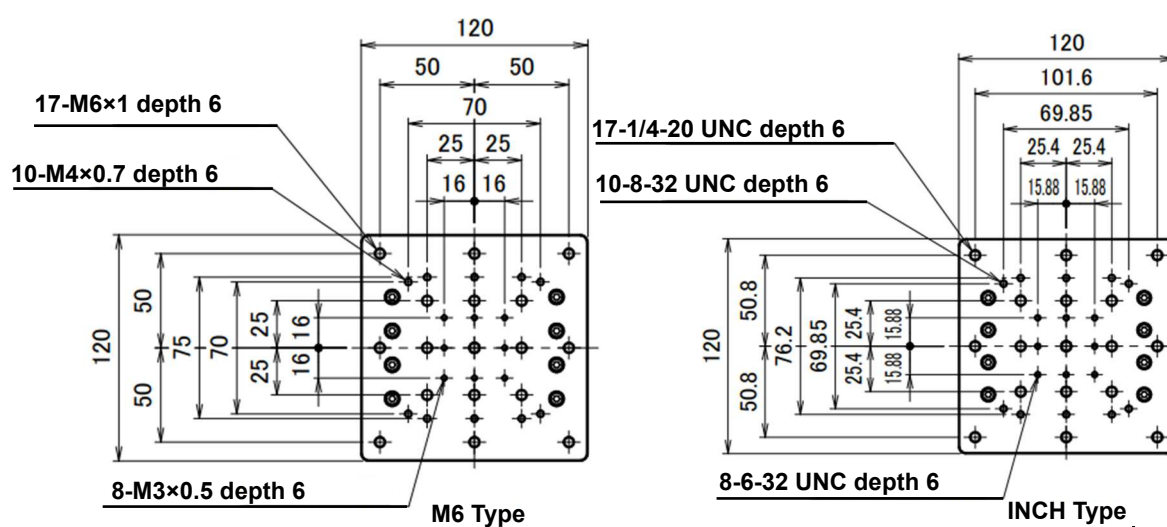
Parts number	A	B	C	D	E	F	G	H
SBIS26-35X-M6, INCH	306.5	79	29	100 (50×2)	28.2	101.6 (50.8×2)	6	17.5
SBIS26-50X-M6, INCH	321.5	86.5	11.5	150 (25, 50×2, 25)	10.3	152.4 (25.4, 50.8×2, 25.4)	10	25
SBIS26-100X-M6, INCH	371.5	111.5	11.5	200 (50×4)	9.9	203.2 (50.8×4)	10	50
SBIS26-200X-M6, INCH	471.5	161.5	11.5	300 (50×6)	9.1	304.8 (50.8×6)	14	100
SBIS26-300X-M6, INCH	571.5	211.5	11.5	400 (50×8)	8.3	406.4 (50.8×8)	18	150



(2) Z type Outlines



品番	A	B	C
SBIS26-35Z-M6, INCH	352.5	125	17.5
SBIS26-50Z-M6, INCH	360	125	25
SBIS26-100Z-M6, INCH	410	150	50
SBIS26-200Z-M6, INCH	510	200	100
SBIS26-300Z-M6, INCH	610	250	150



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